

WHAT IS CLAIMED IS:

- 1 ~~Sub~~ 1. A method for forming a three-dimensional polymeric
2 structure, the method comprising:
3 providing at least one paint layer and a bonding layer coupled
4 to the at least one paint layer and including a first exterior surface;
5 extruding a structural sheet of at least one polymeric material
6 at an extrusion temperature, the sheet having a thickness at least 0.25
7 inches and a second exterior surface;
8 joining the first exterior surface to the second exterior
9 surface to form a thermoformable sheet;
10 forcing the thermoformable sheet against a three-dimensional
11 mold while the sheet is at a thermoformable temperature to deform the
12 sheet into a three-dimensional structure; and
13 removing the three-dimensional structure from the mold.
- 1 2. The method of claim 1, wherein the first exterior surface and
2 the second exterior surface are joined to one another after the structural
3 sheet has undergone at least 40 percent shrinkage from its extruded
4 dimension while cooling from the extrusion temperature.
- 1 3. The method of claim 2, wherein the thermoformable sheet is
2 joined to the laminate after the sheet has shrunk at least 90 percent from
3 its extruded dimensions.
- 1 4. The method of claim 1, wherein at least portions of the first
2 exterior surface and the second exterior surface includes at least one
3 material having an adhesive activation temperature and wherein the first
4 exterior surface and the second exterior surface are joined to one another
5 while at least one of the first exterior surface and the second exterior

6 surface is at a temperature no less than the adhesion activation
7 temperature and less than the extrusion temperature.

1 5. The method of claim 4, wherein the extrusion temperature is
2 greater than 350 degrees Fahrenheit.

1 6. The method of claim 4, wherein the adhesion activation
2 temperature is approximately 270 degrees Fahrenheit.

1 7. The method of claim 1, wherein the first exterior surface of
2 the structural sheet is less than the extrusion temperature and the first
3 exterior surface is joined to the second exterior surface.

1 8. The method of claim 1, wherein the first exterior surface of
2 the structural sheet is at a temperature less than a melting point of the at
3 least one polymeric material when the first exterior surface is being joined
4 to the second exterior surface.

1 9. The method of claim 8, wherein the first exterior surface of
2 the structural sheet is less than approximately 266 degrees Fahrenheit
3 when the first exterior surface is being joined to the second exterior
4 surface.

1 10. The method of claim 1, wherein the first exterior surface of
2 the structural sheet is at a temperature less than approximately 190
3 degrees Fahrenheit when the first exterior surface is joined to the second
4 exterior surface.

1 11. The method of claim 1, wherein the bonding layer includes a
2 covalent adhesive.

1 12. The method of claim 11, wherein the bonding layer includes
2 an olefinic material.

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13. The method of claim 1, wherein materials of the first exterior surface and the second exterior surface are cross linked when being joined to one another.

14. The method of claim 1, wherein at least one of the first exterior surface and the second exterior surface includes a reactive cross-link adhesive with polyolefin.

15. The method of claim 1, wherein the first exterior surface includes a reactive cross-link adhesive with polyolefin.

16. The method of claim 1, wherein the bonding layer has a thickness of less than about 0.2 mils.

17. The method of claim 1, wherein the at least one paint layer and the bonding layer are part of a laminate having a thickness of less than about 2 mils and wherein the thermoformable sheet consists solely of the structural sheet and the laminate.

18. The method of claim 1, wherein the mold is configured to deform the thermoformable sheet into a canoe hull.

19. The method of claim 1, wherein the structural sheet includes polyethylene.

20. The method of claim 19, wherein the structural sheet is composed substantially entirely of polyethylene.

21. The method of claim 1, including providing a PVDF layer coupled to the at least one paint layer.

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1 22. The method of claim 1, wherein the at least one paint layer
2 includes a backing color and at least one additional color distinct from the
3 backing color.

1 23. The method of claim 22, wherein the at least one additional
2 distinct color is provided in a plurality of shapes.

1 24. The method of claim 22, wherein the plurality of shapes are
2 distinct from one another.

1 25. The method of claim 22, wherein the plurality of shapes are
2 in the shape of environmental vegetation.

1 26. The method of claim 1, wherein the first exterior surface is
2 at a temperature less than 350 degrees Fahrenheit when joined to the
3 second exterior surface.

1 27. A method for forming a thermoformable panel, the method
2 comprising:
3 providing at least one paint layer and a bonding layer coupled
4 to the at least one paint layer and including a first exterior surface;
5 providing a structural sheet of at least one polymeric
6 material, the sheet having a thickness of at least 0.25 inches and
7 including a second exterior surface; and
8 joining the first exterior surface to the second exterior
9 surface to form a thermoformable panel.

1 28. The method of claim 27, wherein the first exterior surface
2 and the second exterior surface are joined to one another after the
3 structural sheet has undergone at least 40 percent shrinkage from its
4 extruded dimension while cooling from the extrusion temperature.

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1 29. The method of claim 28, wherein the thermoformable sheet
2 is joined to the laminate after the sheet has shrunk at least 90 percent
3 from its extruded dimensions.

1 30. The method of claim 27, wherein the bonding layer includes
2 a covalent adhesive.

1 31. The method of claim 27, wherein the bonding layer has a
2 thickness of less than about 0.2 mils.

1 32. The method of claim 27, wherein the step of providing a
2 structural sheet comprises extruding a structural sheet of at least one
3 polymeric material.

1 33. A three-dimensional polymeric structure comprising:
2 at least one wall including:
3 a structural polymeric layer having a thickness of at
4 least 0.25 inches; and
5 a laminate including:
6 at least one paint layer;
7 at least one translucent layer overlying a first
8 side of the at least one paint layer; and
9 a bonding layer adjacent and coupled directly to
10 the structural layer and coupled to a second side of the at least one paint
11 layer, the bonding layer having a thickness of less than about 0.2 mils.

1 34. The structure of claim 32, wherein adjacent surfaces of the
2 structural polymeric layer and the bonding layer are joined by cross
3 linking.

1 35. The structure of claim 32, wherein the bonding layer includes
2 a covalent adhesive.

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1 36. The structure of claim 34, wherein the bonding layer includes
2 an olefinic material.

1 37. The structure of claim 32, wherein the bonding layer includes
2 a reactive cross-link adhesive with polyolefin.

1 38. The structure of claim 32, wherein the at least one paint
2 layer, the at least one translucent layer and the bonding layer are part of a
3 laminate having a thickness of less than about 2 mils and wherein at least
4 one wall consists solely of structural layer and the laminate.

1 39. The structure of claim 32, wherein the structural layer
2 includes polyethylene.

1 40. The structure of claim 38, wherein the structural sheet is
2 composed substantially entirely of polyethylene.

1 41. The structure of claim 32, wherein the at least one
2 translucent layer includes a PVDF layer.

1 42. The structure of claim 32, wherein the at least one paint
2 layer includes a backing color and at least one additional color distinct
3 from the backing color.

1 43. The structure of claim 42, wherein the at least one additional
2 distinct colors provided in the plurality of shapes.

1 44. The structure of claim 42, wherein the plurality of shapes are
2 distinct from one another.

1 45. The structure of claim 41, wherein the plurality of shapes are
in the shape of environmental vegetation.

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46. ~~The structure of claim 32, wherein the structure comprises a watercraft.~~

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47. A three dimensional polymeric structure comprising:
at least one wall including:
a structural polymeric layer having a thickness of at
least 0.25 inches; and
a laminate including:
at least one paint layer;
at least one translucent layer overlying a first
side of the at least one paint layer; and
a bonding layer coupled to a second side of the
at least one paint layer, wherein the bonding layer and the structural layer
are joined to one another by cross linking.

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